

CLAIMS

What is claimed is:

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1. An iterative computer-implemented process for creating an entity that approximately satisfies a design requirement that at least one characteristic is not in the prior art, the process invoking iterations, each iteration comprising
 - selecting at least one candidate entity, wherein selection is more likely for a candidate entity that satisfies the design requirement to a greater degree than another candidate entity and for a candidate entity that avoids prior art to a lesser degree than another candidate entity; and
 - creating at least one new candidate entity by creating a variation in the at least one candidate entity.
2. The process defined in Claim 1 wherein creating at least one new candidate entity comprises mutating the at least one candidate entity.
3. The process defined in Claim 2 wherein selecting the at least one candidate entity is performed by simulating annealing.
4. The process defined in Claim 2 wherein selecting at least one candidate controller is performed by hill climbing.

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5. The process defined in Claim 1 wherein the at least one candidate entity is a member of a population of entities.

- 1 6. The process defined in Claim 5 wherein creating at least one new
2 candidate entity comprises performing a crossover operation among a group of
3 candidate entities, the group of entities comprising the selected entity and at least one
4 other entity from the population, the at least one new coordinate entity created by
5 crossover comprising at least a portion of the selected entity and at least a portion of
6 that at least one other entity.

- 1 7. The process defined in Claim 1 further comprising performing genetic
2 programming operations.

- 1 8. The process defined in Claim 1 further comprising genetic algorithms
2 operations.

- 1 9. The process defined in Claim 1 wherein the at least one of candidate entity
2 comprises at least one externally invokable sub-entity and at least one internally
3 invokable sub-entity, the at least one externally invokable sub-entity capable of
4 including at least one invocation of the at least one internally invokable sub-entity.

10. The process defined in Claim 9 wherein the at least of candidate entity

comprises at least two internally invokable sub-entities and wherein at least one of the

at least two internally invokable sub-entities includes at least one invocation of another

of the at least two internally invokable sub-entities.

11. The process defined in Claim 9 wherein the at least of one candidate entity

has at least one internally invokable sub-entity that includes at least one invocation of

itself.

12. The process defined in Claim 1 wherein creating at least one new

candidate entity comprises performing an architecture-altering operation involving at

least one internally invokable sub-entity of the at least one selected entity.

13. The process defined in Claim 1 further comprising creating the at least one

candidate entity by a random process.

14. The process defined in Claim 1 further comprising supplying, from an

external source, the at least one candidate entity partially satisfying the design

requirement or that only partially reads on the prior art.

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15. The process defined in Claim 1 wherein selecting a candidate entity that more closely satisfies the design requirement is ascertained by evaluating the candidate entity by simulating the candidate entity.

16. The process defined in Claim 1 wherein selecting the candidate entity that more closely satisfies the design requirement is ascertained by evaluating the candidate by observing a physical realization representing the candidate entity.

17. The process defined in Claim 1 wherein the candidate entity conforms to a constrained syntactic structure.

18. The process defined in Claim 1 wherein the candidate entity comprises an electrical circuit.

19. The process defined in Claim 1 wherein the candidate entity comprises a controller.

20. The process defined in Claim 1 wherein the candidate entity comprises an antenna.

1 21. The process defined in Claim 1 wherein the candidate entity comprises a
2 mechanical system.

1 22. An iterative computer-implemented process for creating an entity that
2 approximately satisfies a design requirement that includes technical requirements and
3 dissimilarity to preexisting technology, the process invoking iterations, each iteration
4 comprising:

5 producing a structure;

6 determining behavior and characteristics of the structure;

7 comparing the structure to preexisting technology;

8 determining fitness of the structure by combining compliance with the technical
9 requirements and dissimilarity to preexisting technology.

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